A. NOTEMAN.
Rotary-Pumps.

No. 199,737. Patented Jan. 29, 1878.

FIG. 1.

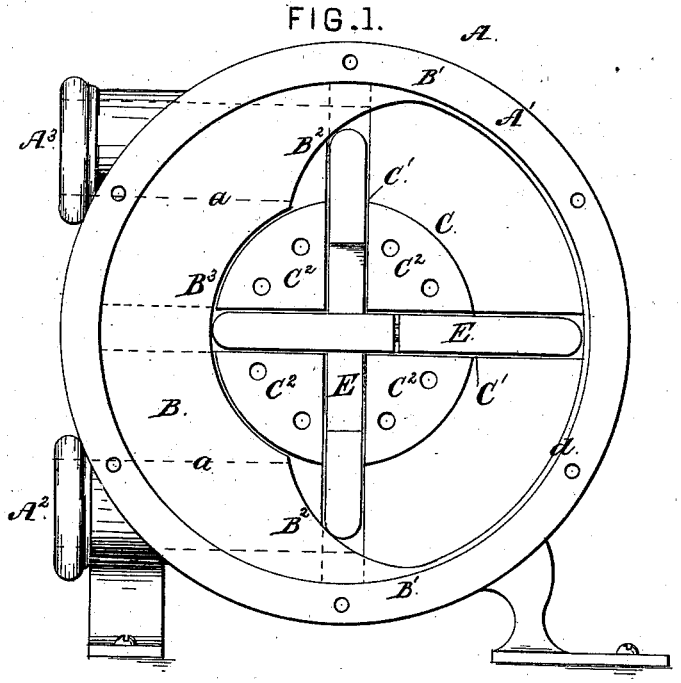


FIG. 2.

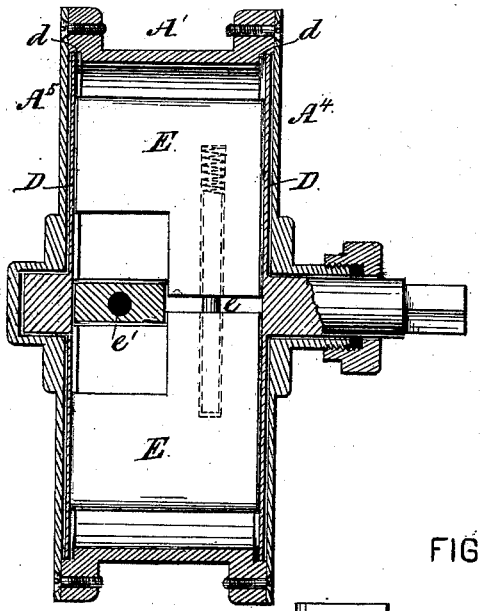


FIG. 3.

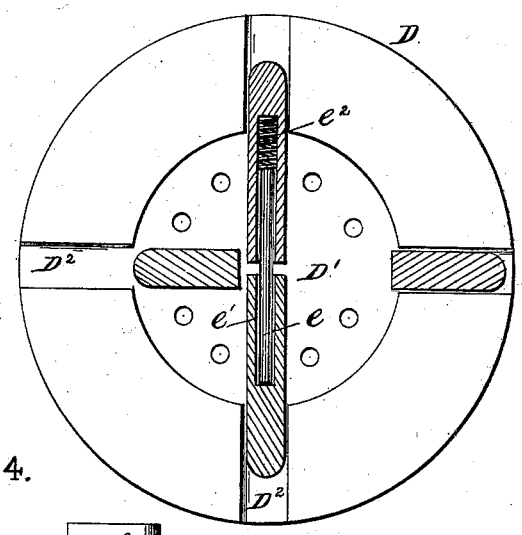
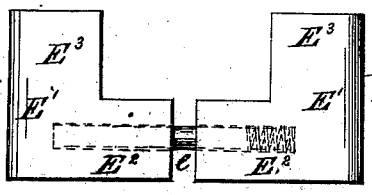


FIG. 4.



WITNESSES
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UNITED STATES PATENT OFFICE.

ALONZO NOTEMAN, OF TOLEDO, OHIO.

IMPROVEMENT IN ROTARY PUMPS.

Specification forming part of Letters Patent No. **199,737**, dated January 29, 1878; application filed April 28, 1877.

To all whom it may concern:

Be it known that I, ALONZO NOTEMAN, of the city of Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Improvement in Rotary Pumps, which improvement is fully set forth in the following specification:

My invention relates to improvements in rotary pumps, the nature of which will be fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side view, with the end plate of the casing removed. Fig. 2 is a vertical section. Fig. 3 is one of the guide-plates, with the position of the pistons in section shown, and Fig. 4 is one of the pistons.

A is the casing, within which are placed the operating parts of my device. B is the abutment. C is the piston-head, divided by cross-channels C^1 C^1, placed at right angles to each other, into the four equal sections C^2 C^2. D D are the guide-plates, secured to the ends of the piston-head, and provided with journals revolving in bearings in the casing A, and E E are the sliding pistons, moving back and forth in the channels C^1 C^1 in the piston-head C.

The casing A is composed of the cylindrical part A^1, having the suction and discharge ports A^2 A^3 and end plates A^4 A^5, which are provided with central bearings, in which revolves the axis of the piston-head, the whole being secured firmly together by suitable bolts or screws, as shown.

The abutment B is made semicircular in form, and so that it fills about one-third of the inner space or chamber of the casing. Its ends or points B^1 are made to extend past the vertical diameter, as shown in Fig. 1, thus occupying more than half the inner circumference of the casing, by which construction the curved or cam surfaces B^2 engage and move the piston, and open the discharge-port before the water between the engaged piston and that immediately following shall have made a half revolution of the casing, thus relieving the friction and creating a vacuum, and discharging the water at a much earlier period than is accomplished in ordinary devices of this class. The abutment B covers, and has formed through its ends water-passages communicating with the ports A^2 A^3, as indicated in dotted lines, Fig. 1.

B^3 is a semicircular recess, formed in the face of the abutment B. It extends between the inner or adjacent sides *a a* of the ports A^2 A^3, and it is adapted to fit snugly over and cover nearly one-half of the circumference of the piston-head C.

The piston-head C has formed through its center, and at right angles to each other, the vertical channels C^1 C^1, in which the sliding pistons E E are placed. It is rigidly secured to the head or guide plates D D, which, for greater firmness, are recessed, as shown at D^1, Fig. 3; and it is journaled centrally in the casing, with one side fitting snugly into the recess B^3.

The head-plates D D are provided with suitable journals, which are seated in bearings in the outer plates A^4 A^5, one of the journals being extended so as to provide a shaft for making connections with other machinery. They are made a little larger in diameter than the diameter of the inner circumference of the part A^1, and have their rims packed in a rabbet or groove, *d*, formed around the edge of the casing. The sides of the abutment B are slightly cut away to provide space for the plates beneath the plates A^4 A^5. Across their inner face, and corresponding to and coincident with the channels C^1 C^1 in the piston-head, are formed the guide-channels D^2, in which the edges of the pistons E move back and forth.

It will be seen and understood that, if the head-plates D be not recessed for the reception of the end of the piston-head, as hereinbefore described, the channels D^2 will extend entirely across the plates; but otherwise, they will extend only from the circumference to the recess D^1. The latter, being formed the same depth as the former, makes the channel substantially entirely across.

E E are the pistons, made in the form shown, and divided into the two equal parts E^1 E^1, each part being composed of the horizontal and vertical wings E^2 E^3. The valves, being divided in the middle, will be extended or contracted, as required, to preserve a perfect packing against the walls of the casing and the abutment B. In the cross-movement of the valves the sharp corners of the contigu-

ous edges of the halves E^1 E^1 of one valve would be liable to interfere or catch on the side of the other valve, and seriously obstruct the working of the pump. To obviate this difficulty I have placed a supporting-pin, *e*, in suitable holes e^1 in the horizontal wings E^2, which preserves the bearing-edges of the wings in the same line, and at the same time permits a free to-and-fro movement thereon of one or both of the halves. In one of the holes e^1 I place a spring, e^2, which, acting on the free end of the pin *e*, will force the wing or half E^1 outward, and pack the piston firmly against the walls of the casing and abutment. By the foregoing it will be seen that I am enabled to employ two pistons, crossing each other, with capability of extension, and sliding in cross-channels formed through the piston-head C, thereby giving me all the advantages of a piston made solid or in one piece, and of a piston made with capability of extension.

When the head-plates D are placed in position, with their rims properly packed in the rabbet or groove *d*, as hereinbefore explained, and the end plates A^4 A^5 are bolted on, as shown in Fig. 2, it will be seen that there is made a water and air tight chamber within the casing, the only openings being the ports A^2 A^3, thereby providing a perfect vacuum-chamber for the action of the pistons.

It will be further seen that the valves E are in the channels D^2, with capability of a free and steady to-and-fro movement, and that the great amount of friction consequent from the extended surfaces of the sides of the pistons bearing against the sides of the channels C^1 is obviated, and the pistons are not so liable to become worn and inefficient by long-continued use.

By inspecting Fig. 1 it will be seen that any given piston is never packed between the walls of the cylinder A^1, but is always packed between the wall of said cylinder and the face of the abutment B, or between the cam-surfaces B^2.

It will be further seen, when one of the pistons is brought across, so that it will receive the full force of the water flowing in through the suction-port A^2, that less than a half-revolution of said piston will bring it round to and partially open the discharge-port A^3, which partial opening will relieve the friction of the water, which has by this time expended its force behind the piston.

By reason of the great amount of friction obviated by the construction of my device, I am enabled to furnish a pump which can be operated with a much slower movement than, and with improved results over, the ordinary rotary pump.

The pistons are moved by the positive action of the cam-surfaces, no reliance being placed on gravity as a moving force. The pistons are kept constantly packed, so that all noise and clatter are avoided. Between the suction-port and discharge-port two pistons are always closely packed with a vacuum in front of the forward one. The piston being moved by the cam-surfaces into position, no friction, except that caused by the packing-spring e^2, is made on the face of the recess B^3, so that the abutment within this recess does not become worn so as to form an unprotected passage over the piston-head, through which air could pass from the discharge-pipe back to the piston at the suction-pipe.

The end of the abutment may be hardened by any well-known process, so as to prevent wear of the cam-surfaces B^2. Or these ends may be formed separate from and closely fitted to the abutment by any suitable means whereby they could be removed when worn, and replaced by others.

I do not claim, broadly, the construction of a casing with an abutment against which the piston-head revolves; nor do I claim, broadly, the construction of pistons adapted to move across each other in channels in the piston-head, as such constructions are old and well known; but

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The semicircular abutment B, constructed with the recess B^3 and cam-surfaces B^2, and having its ends or points B^1 extended past the central line or diameter of the cylinder A^1, and having through it water-passages communicating with the ports A^2 A^3 and the inner chamber of the casing, in combination with the piston-head C and pistons E, substantially as set forth.

2. In a rotary pump, the head-plates D, constructed with the guide-channels D^2, in combination with the piston-head C and pistons E, for the purpose set forth.

3. In a rotary pump, the pistons E E, constructed as described, and divided into the equal parts E^1 E^1, and held in line by the pin *e* in holes e^1, and provided with the springs e^2, and placed so as to move at right angles across each other, in combination with the piston-head C, having channels C^1 C^1 formed at right angles to each other, and head-plates D, constructed with channels D^2, substantially as set forth.

4. A rotary-pump casing, A, constructed with the cylindrical part A^1, having rabbets or packing-grooves *d* formed around its edges or rim, abutment B, and plates A^4 A^5, arranged and adapted to receive and retain the head-plates D supporting and carrying the piston-head C and pistons E, as set forth.

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Witnesses:
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